

REMARKS

Applicants amend claims 6, 7, 11, 14, 16 and 20, and amend the specification to correct certain minor informalities. Accordingly, claims 2-12 and 14-20 remain pending in the application.

Reexamination and reconsideration of this patent application are requested in view of the following Remarks.

OBJECTIONS TO THE DRAWINGS

Applicants traverse the objection to FIG. 3A indicating that it should somehow be inverted, as Applicants are unaware of any rule which specifies a particular angle or viewpoint from which an object **must** be shown. The Examiner cites 37 C.F.R. § 1.84(h), however Applicants submit that 37 C.F.R. § 1.84(h) simply states a preference that drawings be arranged when possible such that the sheet is viewed in an upright manner (i.e., with the long sides of the sheets at the left and right, and the short sides of the sheet at the top and bottom). Certainly nothing in 37 C.F.R. § 1.84(h) suggests that Applicants should not present bottom views of embodiments of their invention when such bottom views are the most helpful for understanding of the invention. So it is seen that the **drawing** is upright, but it depicts an **object** in a view one may or may consider inverted. In any event, 37 C.F.R. § 1.84(h) is *precatory* in nature, using the suggestive term “should,” rather than the mandatory term “must.” This rule for interpreting the CFR is very old and well established and should require no case law citation from Applicants.

Regarding the objection to FIG. 4 that complains that FIG. 4 does not extend above 150 nm, by this Amendment Applicants amend claims 6, 11 and 20 to recite a range only extending up to 150 nm.

Therefore, the objection to FIG. 4 is deemed to be moot.

Accordingly, Applicants request that the objections to the drawings be withdrawn.

OBJECTIONS TO THE SPECIFICATION

Applicants hereby amend paragraphs [0025], [0090], and [0095] of the specification.

Accordingly, Applicants request that the objections to the specification be withdrawn.

CLAIM OBJECTIONS

The Examiner objects to claims 2-6 and 14-15 as supposedly being of improper dependent form.

Applicants traverse these objections.

37 C.F.R. § 1.75 applies to the numbering and order of claims when originally filed with the specification. It does not apply to claims submitted in an amendment.

Indeed, there is no requirement in 37 C.F.R. (particularly, 37 C.F.R. § 1.121) that Applicants renumber claims in an amendment whenever a new claim is added with a higher claim number, and lower numbered claims are amended to depend therefrom. Indeed, M.P.E.P. § 1302 and 37 C.F.R. § 1.126 (*"When the application is ready for allowance, the examiner, if necessary, will renumber the claims"*) indicate that it is the Examiner's responsibility upon allowance of an application to renumber the claims so that the dependent claims follow the independent claim from which they depend. Furthermore, the undersigned attorney notes that this has been the standard practice for untold years, and is confident that the Examiner's supervisor is well aware of this and would so advise the Examiner if the Examiner would consult with said supervisor.

The Examiner also objects to claims 2-12 and 14-20 on various grounds.

Regarding the word "*areas*" in claims 7, 14 and 16, Applicants submit that the word is accurate, and accordingly Applicants traverse the objections and decline to amend the claims as suggested by the Examiner.

Regarding claim 16, line 10, Applicants have amended the claim to replace "are" with "is" for grammatical correctness.

Accordingly, Applicants request that the objections to the claims be withdrawn.

35 U.S.C. § 112

The Examiner rejects claims 2-12 and 14-20 under 35 U.S.C. § 112, second paragraph.

The Examiner states that the phrase "*the mask is used to pattern a photoresist layer by passing light therethrough*" in claims 7, 14 and 16 is supposedly unclear.

Applicants traverse these rejections. It is clear from simple grammar, logic, and even the most passing familiarity with the art of photolithography that "*the mask is used*" by "*passing light therethrough.*"

Furthermore, claims 7, 14 and 16 do not recite "an intended use" of the claimed mask, but instead recite specific characteristics of the claimed mask. For example, claims 14 and 16 do **not** recite "wherein the mask is used to pattern a photoresist layer." Instead, claims 14 and 16 each recite specific properties or characteristics of the mask under certain conditions (indeed characteristics that distinguish it from Ham's mask). Namely, **when** the claimed mask "*is used to pattern a photoresist layer by passing light therethrough*" it has the characteristic that "*the auxiliary pattern reduces only a portion of an intensity of the light, and a photoresist pattern is formed at an area corresponding to an edge of the trench, and is not formed at areas corresponding to the auxiliary pattern.*" This is not an "intended use" for the mask; this is a fundamental property of the mask. Such claim language is extremely common and well accepted in American patent law and is entitled to be accorded full patentable weight.

Regarding claim 11, the claim has been amended to clarify that it refers to the exact same auxiliary pattern as recited in its parent claim 7.

Accordingly, for at least these reasons, Applicants request that the rejections of claims 2-12 and 14-20 under 35 U.S.C. § 112, second paragraph be withdrawn.

35 USC § 102/103

The Office Action rejects claims 2-5, 7-10, 12 and 14-15 under 35 U.S.C. § 102, or in the alternative under 35 U.S.C. § 102, over Ham U.S. patent 5,567,552 (“Ham”); claims 6 and 11 under 35 U.S.C. § 103 over Ham in view of Randall et al. U.S. patent application publication 2002/0094492 (“Randall”); claims 16-19 under 35 U.S.C. § 103 over Ham in view of Kamon U.S. patent 6,737,198 (“Kamon”) or Steinberg et al. U.S. patent application publication 2002/0031711 (“Steinberg”); and claim 20 under 35 U.S.C. § 103 over Ham in view of Randall and further in view of Kamon or Steinberg.

Applicants submit that all of the claims 2-12 and 14-20 are patentable for at least the following reasons.

Claim 14

Among other things, the mask of claim 14 has a property such that, when the mask is used to pattern a photoresist layer by passing light therethrough, the auxiliary pattern reduces an intensity of the light at areas corresponding to the auxiliary pattern only partially, and a photoresist pattern is formed at an area corresponding to an edge of the trench, and is not formed at areas corresponding to the auxiliary pattern.

Applicants submit that Ham does not disclose or suggest such features.

At the outset, as explained above and in previous Responses, Applicants submit that this does not recite “an intended” use, but instead recites specific and definite properties or characteristics of the mask. So it is deemed to carry patentable weight.

As shown in FIG. 2 of Ham, Ham’s auxiliary pattern 3 blocks entirely the intensity of the light at areas corresponding to the auxiliary pattern 3. When light is passed through Ham’s photomask, is not “inherently” or otherwise capable of reducing an intensity of the light at areas corresponding to the auxiliary pattern only partially, or capable of forming a photoresist pattern at an area corresponding to an edge of the trench, and not forming the photoresist at areas corresponding to the auxiliary pattern. Indeed, again with reference to FIG. 2, it is very clear that the light intensity produced by Ham’s mask at the edge of the trench is exactly the same (zero)

as the light intensity at the areas corresponding to the auxiliary pattern 3.

Accordingly, for at least these reasons, Applicants submit that claim 14 is clearly patentable over Ham.

Claims 2-5 and 15

Claims 2-5 and 15 depend from claim 14 and are deemed patentable for at least the reasons forth above with respect to claim 14.

Claim 7

Among other things, the method of claim 7 produces a mask that has a property such that, when the mask is used to pattern a photoresist layer by passing light therethrough, the auxiliary pattern reduces an intensity of the light at areas corresponding to the auxiliary pattern only partially, and a photoresist pattern is formed at an area corresponding to an edge of the trench, and is not formed at areas corresponding to the auxiliary pattern.

As explained above with respect to claim 14, Ham does not disclose any method that would produce a mask having these properties.

Accordingly, Applicants submit that claim 7 is clearly patentable over Ham.

Claims 8-10 and 12

Claims 8-10 and 12 depend from claim 14 and are deemed patentable for at least the reasons forth above with respect to claim 7.

Claims 6 and 11

Applicants submit that claims 6 and 11 are patentable over any proper combination of Ham and Randall for at least the following reasons.

Claims 6 and 11 depend from claims 14 and 7, respectively. Randall does not remedy the shortcomings of Ham as explained above with respect to claim 7 and 14. Therefore, claims 6 and 11 are deemed patentable for at least the reasons set forth above with respect to claims 7 and 14, and for the following additional reasons.

The cited portions of Randall pertaining to the Cr regions 34 and 36 (FIGs. 3a-b), and the 1X mask mentioned in Randall all very refer to **binary** type masks, not phase shift masks as recited in claims 6 and 11, and as described in Ham which the

Examiner attempts to modify by resorting to Randall. Of course small patterns are used in such masks. However that provides no suggestion to the inclusion of such features in a phase shift mask, which the Examiner should be aware operates on quite different principles. Meanwhile, the Examiner cites the gate line widths of 150 nm in a fabricated device discussed in Randall as supposedly providing some evidence of the width of an auxiliary pattern on a phase shift mask. Indeed, Randall does not even apparently discuss any auxiliary pattern in a phase shift mask.

So, no reason has been offered as to why anyone of ordinary skill in the art at the time the invention was made would modify Ham's phase shift mask to make the width of his chrome region 5B to be equal to the patterns used on Randall's binary mask!

Accordingly, for at least all of these reasons, Applicants submit that claims 6 and 11 are patentable over the cited prior art.

Claims 16-19

At the outset, as explained above with respect to claims 7 and 14, Ham does not disclose or suggest a mask that includes a combination of features wherein when the mask is used to pattern a photoresist layer by passing light therethrough, the auxiliary pattern reduces an intensity of the light at areas corresponding to the auxiliary pattern only partially, and a photoresist pattern is formed at an area corresponding to an edge of the trench, and is not formed at areas corresponding to the auxiliary pattern. Neither Kamon nor Steinberg remedies these shortcomings.

Accordingly, for at least these reasons, Applicants submit that claims 16-19 are all patentable over the cited art.

Claim 20

Claim 20 depends from claim 16. Randall does not remedy the shortcomings of Ham as explained above with respect to claim 16. Therefore, claim 20 is deemed patentable for at least the reasons set forth above with respect to claim 16, and for the following additional reasons.

As explained above with respect to claims 6 and 11, there is no reason why

anyone of ordinary skill in the art at the time the invention was made would modify Ham's phase shift mask to make the width of his chrome region 5B to be equal to the patterns used on Randall's binary mask!

Accordingly, for at least these reasons, Applicants submit that claim 20 is patentable over the cited art.

CONCLUSION

In view of the foregoing explanations, Applicants request that the Examiner reconsider and reexamine the present application, allow claims 2-12 and 14-20, and pass the application to issue. In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Kenneth D. Springer (Reg. No. 39,843) at (571) 283-0720 to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17, particularly extension of time fees.

Submitted,

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